

Catastrophic Infections in Nephrology

By

Dr. Ahmed Mohammed Abd El Wahab

Lecturer of Internal Medicine
(Nephrology)

Spectrum

1. Emphysematous UTIs
2. Acute papillary necrosis
3. Pyonephrosis
4. Renal cortical abscess (haematogenous spread of bacteria from a 1ry extrarenal focus)
5. Renal corticomedullary abscess develops as an ascending infection.
It is more likely to form a **perinephric abscesses**
6. Renal mucormycosis
7. Infectious granulomatous nephritis

Risk Factors

- advanced age (20% of population above 70 years of age)
- Females
- Stroke
- spinal cord injury
- Dementia
- Parkinson's disease
- **diabetes mellitus**
- prostate enlargement
- prostate surgery
- multiple pregnancies
- Obesity
- VUR , Stones

Microbiological Spectrum

- The majority of ascending infections being caused by *E.coli*
- *Proteus spp.*, *Enterobacter spp.*, *Enterococcus .*
Klebsiella and B
streptococci
- Fungi, particularly *Candida species*.



- A 70y, F.

- C/O

fever(4d), right flank pain, polyurea, and altered sensorium.

- Hx


DM(1 m, oral TTT)

- O/E

Ill looking, agitated, and talking irrelevant;

HR 110 RR 34 BP 90/60

Air entry was reduced and crepitations were audible more on the right side.



Suprapubic and right renal angle tenderness was present and no abdominal mass was palpable.

There was no neuro deficit or localizing sign.

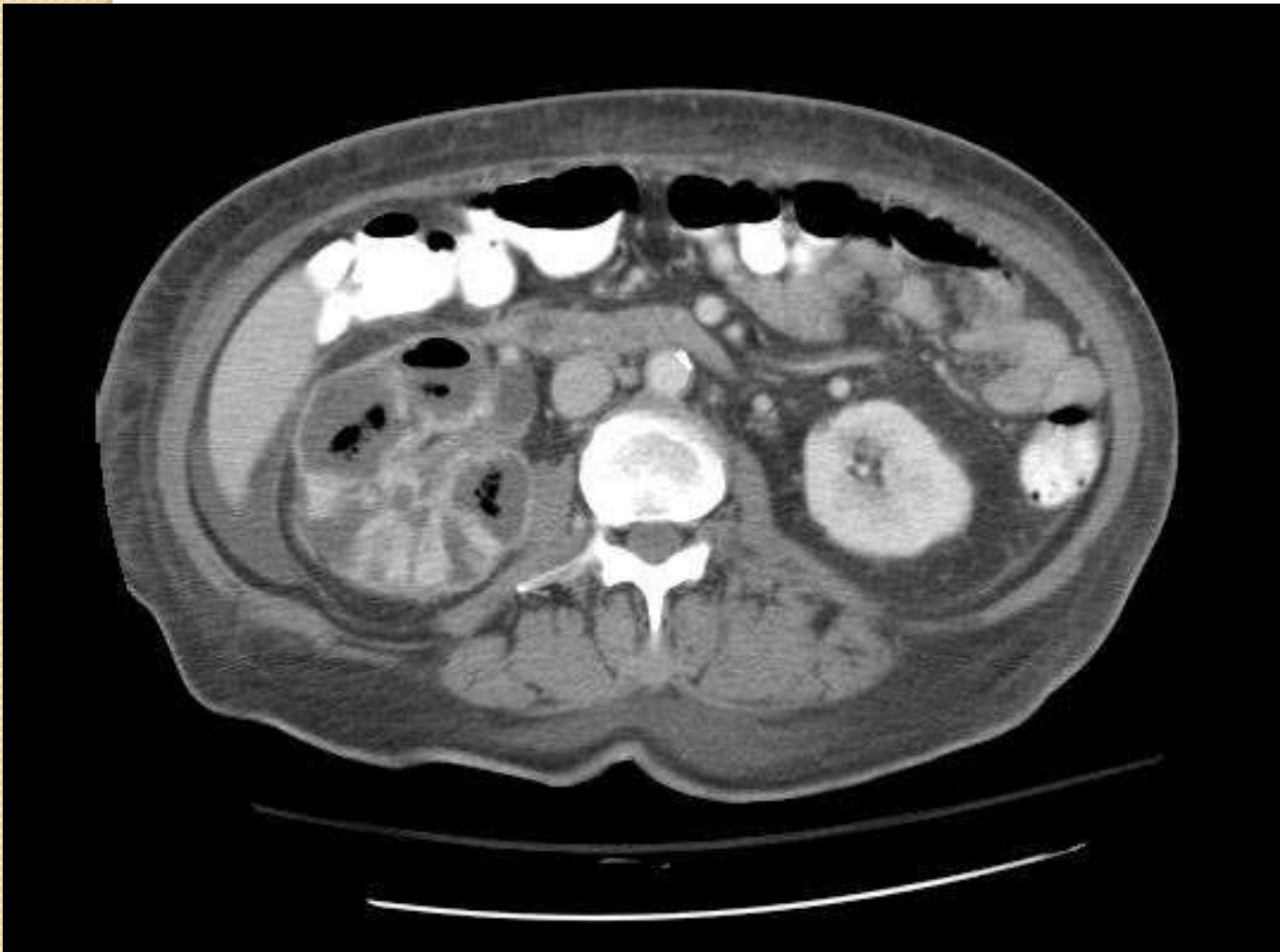
Inv.,

Parameter	Admission
Hb (g%)	9.9
TLC (mm ³)	9500
Platelets/mm ³	36,000
Glucose (mg/dl)	408
Urea (mg/dl)	95
Creatinine (mg/dl)	4.6
Na (meq/l)	120
K (meq/l)	3.8
pH	7.37
PCO ₂ (mmHg)	18.3
HCO ₃ (meq/l)	10.4
PO ₂ (mmHg)	56.4
SaO ₂ (%)	89.5

- Pyuria, no ketones
- CT brain N
- CSF N
- CXR: bil. Pleural eff.
- Abd. US: Rt. Kid. Shadows
- Bl. Culture: no growth

NC CT abd.

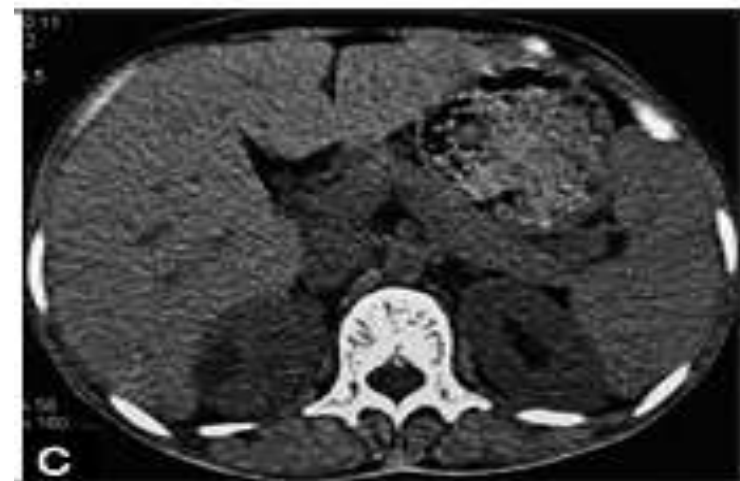
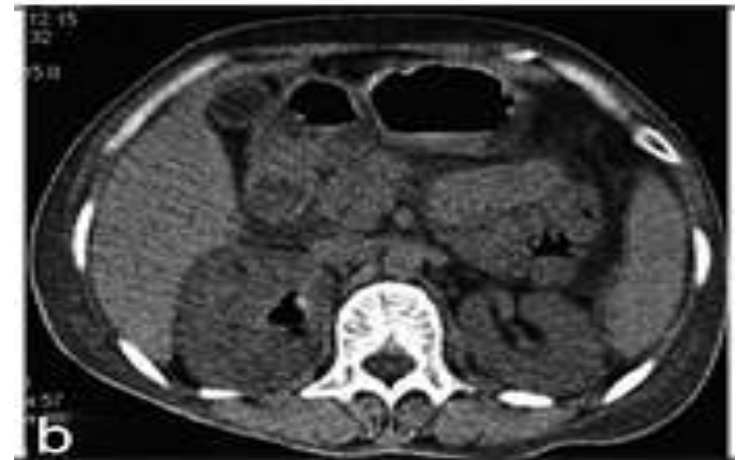




Emphysematous-pyelonephritis

After TTT (medical+PCD)

Parameter	Admission	Day 3	Day 15
Hb (g%)	9.9	10.9	11.5
TLC (mm ³)	9500	8800	8000
Platelets/mm ³	36,000	68,000	82,000
Glucose (mg/dl)	408	365	162
Urea (mg/dl)	95	120	60
Creatinine (mg/dl)	4.6	2.5	1.2
Na (meq/l)	120	145	144
K (meq/l)	3.8	3.37	4.2
pH	7.37	7.35	7.35
PCO ₂ (mmHg)	18.3	24	40
HCO ₃ (meq/l)	10.4	13.1	19
PO ₂ (mmHg)	56.4	66	76
SaO ₂ (%)	89.5	90	99



Emphysematous Pyelonephritis (EPN)

- Acute necrotizing parenchymal and perirenal infection caused by gas-forming uropathogens
- Many patients have urinary tract obstruction associated with urinary calculi or papillary necrosis and significant renal functional impairment
- The overall mortality rate has been reported to be 50%

Clinical Presentation

- Almost all patients display the classic triad of fever, vomiting, and flank pain
- Severe: Septic shock
- All of the documented cases of emphysematous pyelonephritis have occurred in adults
- M:F= 1:4

Radiologic Staging

- In 1996, Wan et al.,

1. Type I - Characterized by parenchymal destruction with streaky or mottled parenchymal gas with an absence of fluid collection, which has a fulminant course and high risk of mortality
2. Type II - Characterized by renal or perirenal fluid collection with bubbly gas collection in the perinephric space or in the collecting system and a mortality rate of 18%

- In 2000, Huang et al.,

1. Class 1 - Gas confined to the collecting system
2. Class 2 - Gas confined to the renal parenchyma alone
3. Class 3A - Perinephric extension of gas or abscess
4. Class 3B - Extension of gas beyond the Gerota fascia
5. Class 4 - Bilateral EPN or EPN in solitary kidney



- CT scan obtained after administration of contrast material shows a low-attenuation area (*arrowheads*) in the right kidney due to acute pyelonephritis as well as a subcapsular abscess with fluid and bubbly and loculated gas

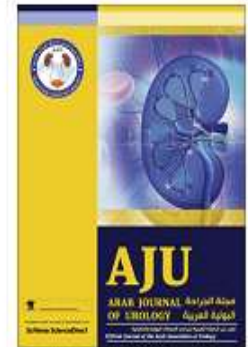
Management.

Arab Journal of Urology (2013) xxx, xxx-xxx



Arab Journal of Urology
(Official Journal of the Arab Association of Urology)

www.sciencedirect.com



REVIEW

Emphysematous pyelonephritis: Time for a management plan with an evidence-based approach

Omar M. Aboumarzouk ^{a,*}, Owen Hughes ^b, Krishna Narahari ^b,
Richard Coulthard ^b, Howard Kynaston ^b, Piotr Chlostá ^c, Bhaskar Somani ^d

Cont.,

Methods: We systematically reviewed previous articles published from 1980 to 2013 that included studies reporting on EPN, and applying the Cochrane guidelines, we conducted a meta-analysis of the results.

Results: In all, 32 studies were included, with results for 628 patients (mean age 56.6 years, range 33.8–79.9). There were 462 women, outnumbering men by 3:1. Diabetes was present in 85% of the cases. Fevers and rigor (74.7%), pyuria (78.2%) and pain (70.4%) were the most common symptoms. Shock was associated with 54.4% of deaths while obstructive uropathy was associated with 15.1% of deaths. Computed tomography was diagnostic in all the cases. Percutaneous drainage (PCD) and medical management (MM) alone were associated with a significantly lower mortality rate than was emergency nephrectomy (EN), with an odds ratio (95% con-

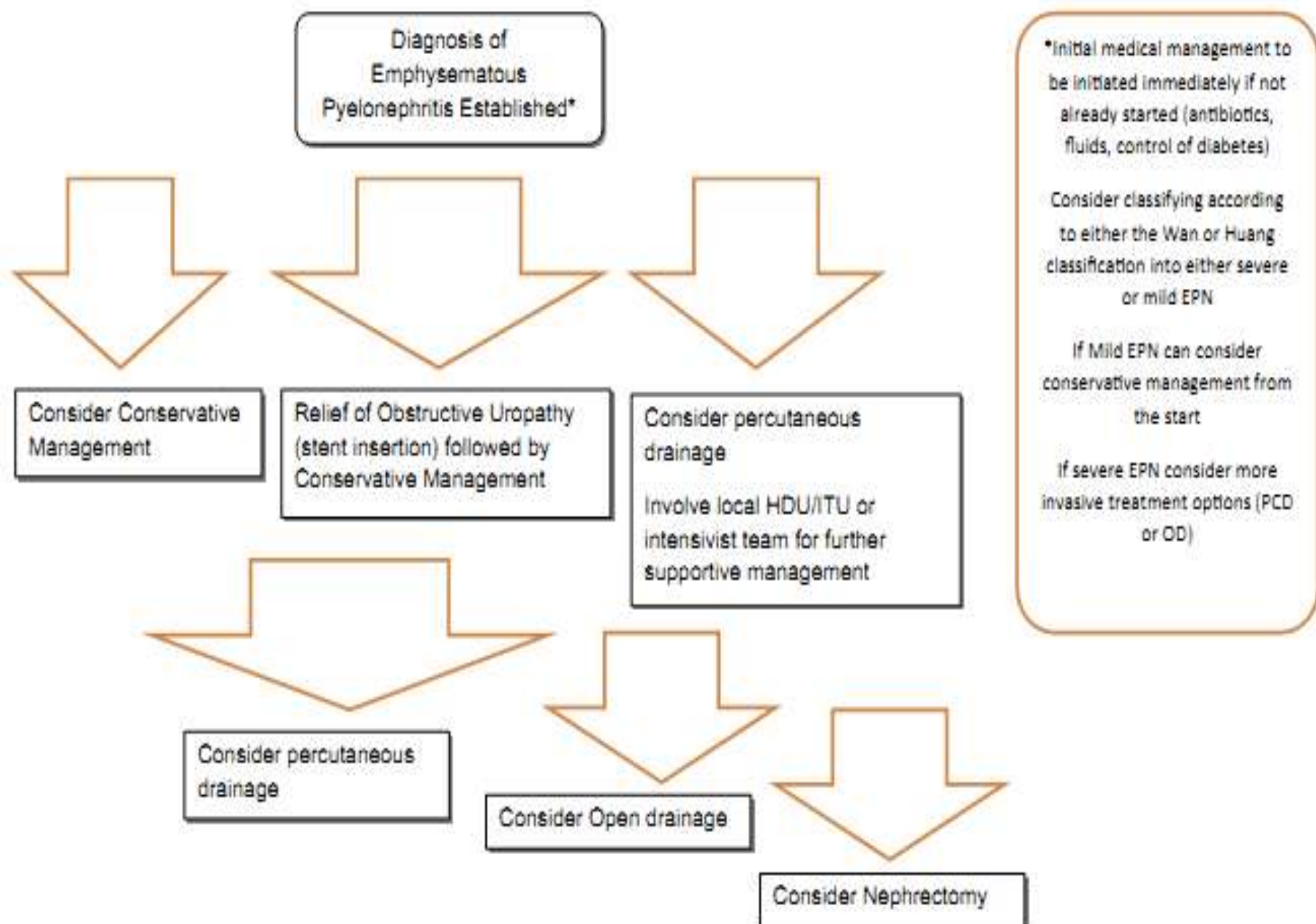


Fig. 3 Recommendations for managing EPN.

Clinical Outcomes of Nonoperative Management in Emphysematous Urinary Tract Infections

Marc A. Bjurlin, Stephen D. Hurley, Dae Y. Kim, Matthew R. Cohn, Michael D. Jordan, Ronald Kim, Naveen Divakaruni, and Courtney M. P. Hollowell

METHODS

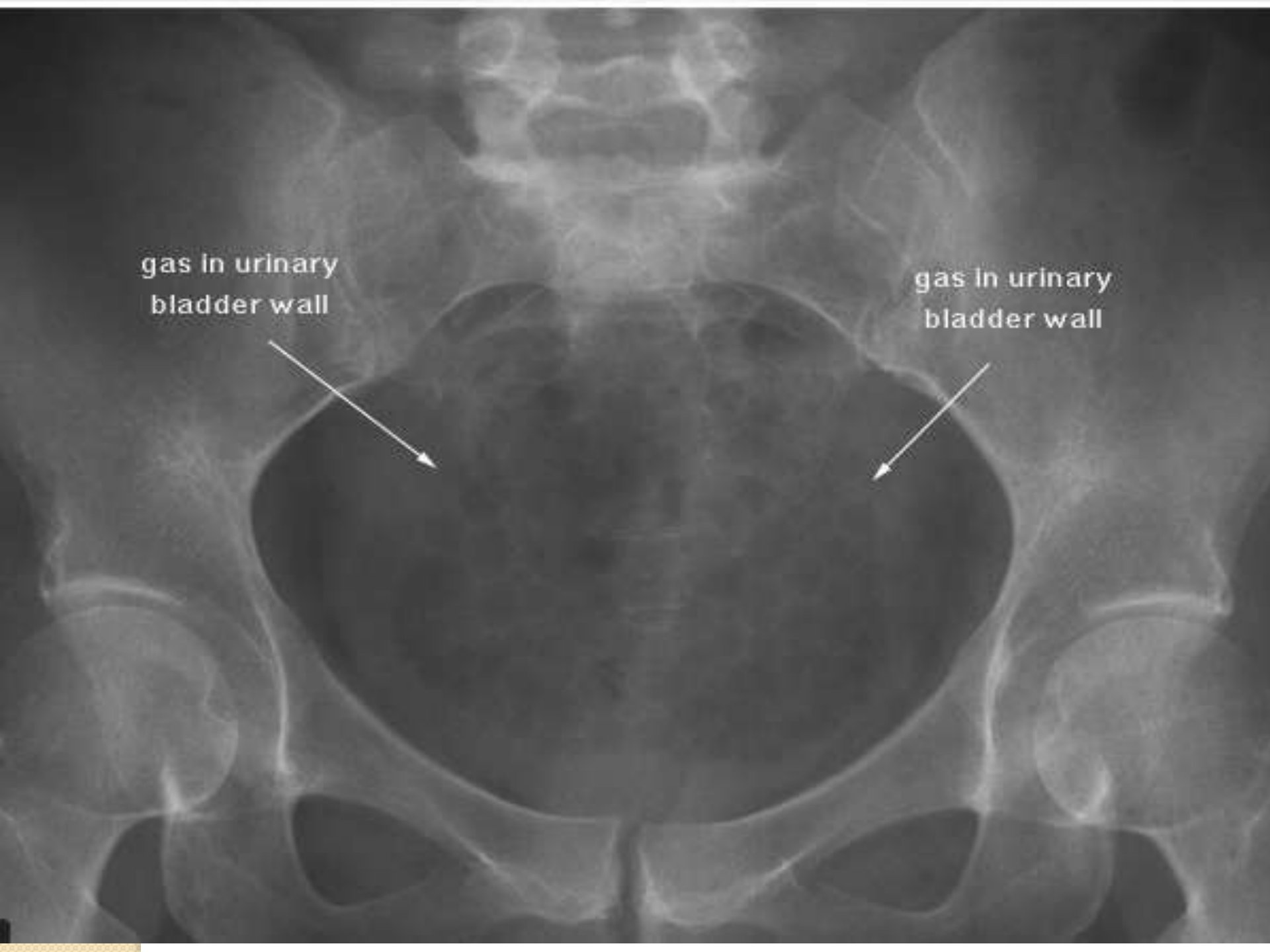
We retrospectively reviewed 28 consecutive cases of EUTI over a 5-year period, all of which were treated with urinary drainage and medical management without surgical intervention. EUTIs were classified as either emphysematous pyelonephritis (EP) or emphysematous cystitis (EC). Clinical, diagnostic, and therapeutic data were analyzed.

CONCLUSION

Early detection, medical management, and urinary drainage of EUTI can result in a favorable prognosis. This strategy results in low levels of mortality without the need for surgical intervention and can preserve renal function. UROLOGY 79: 1281-1285, 2012. © 2012 Elsevier Inc.

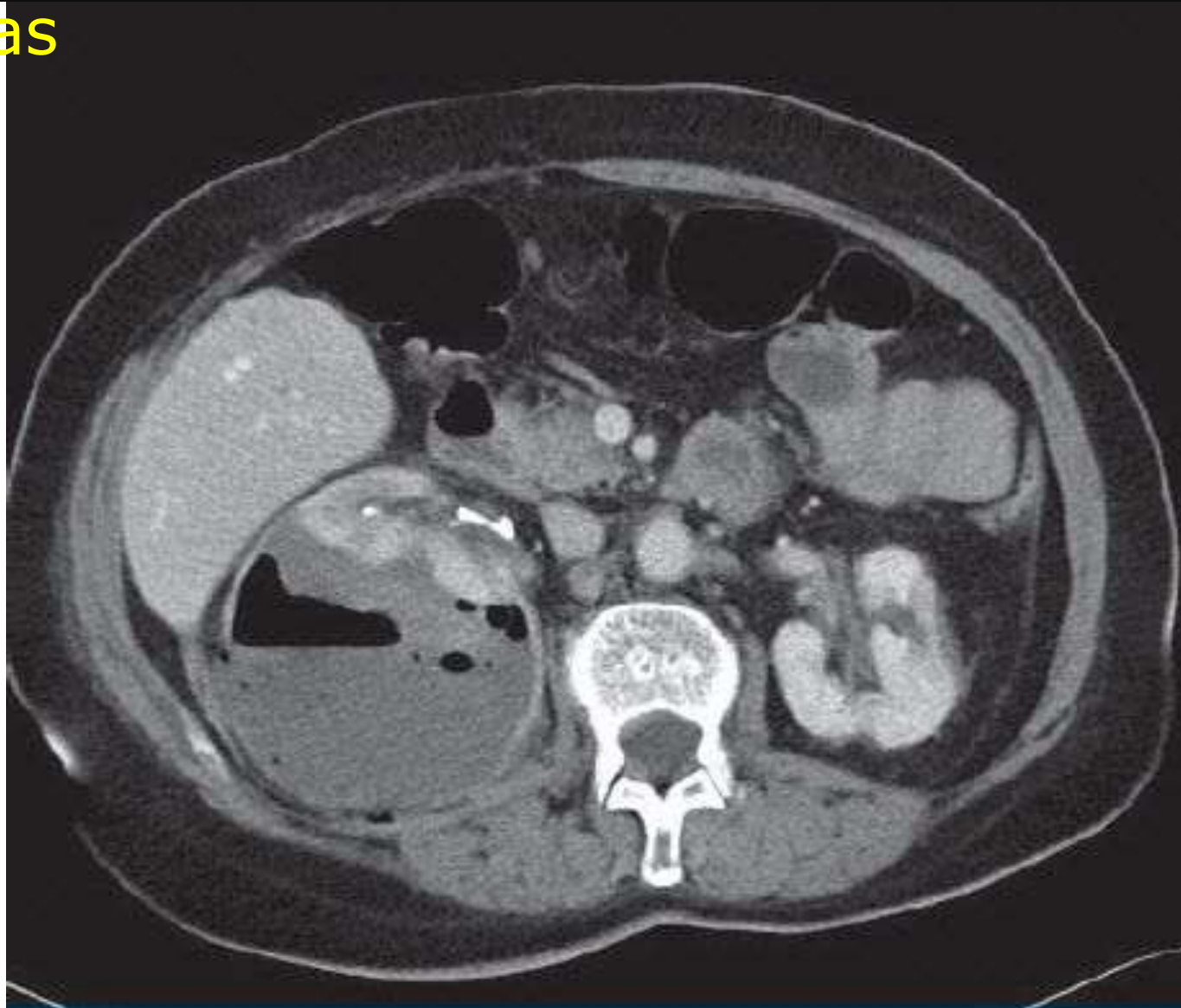
gas in urinary
bladder wall

gas in urinary
bladder wall





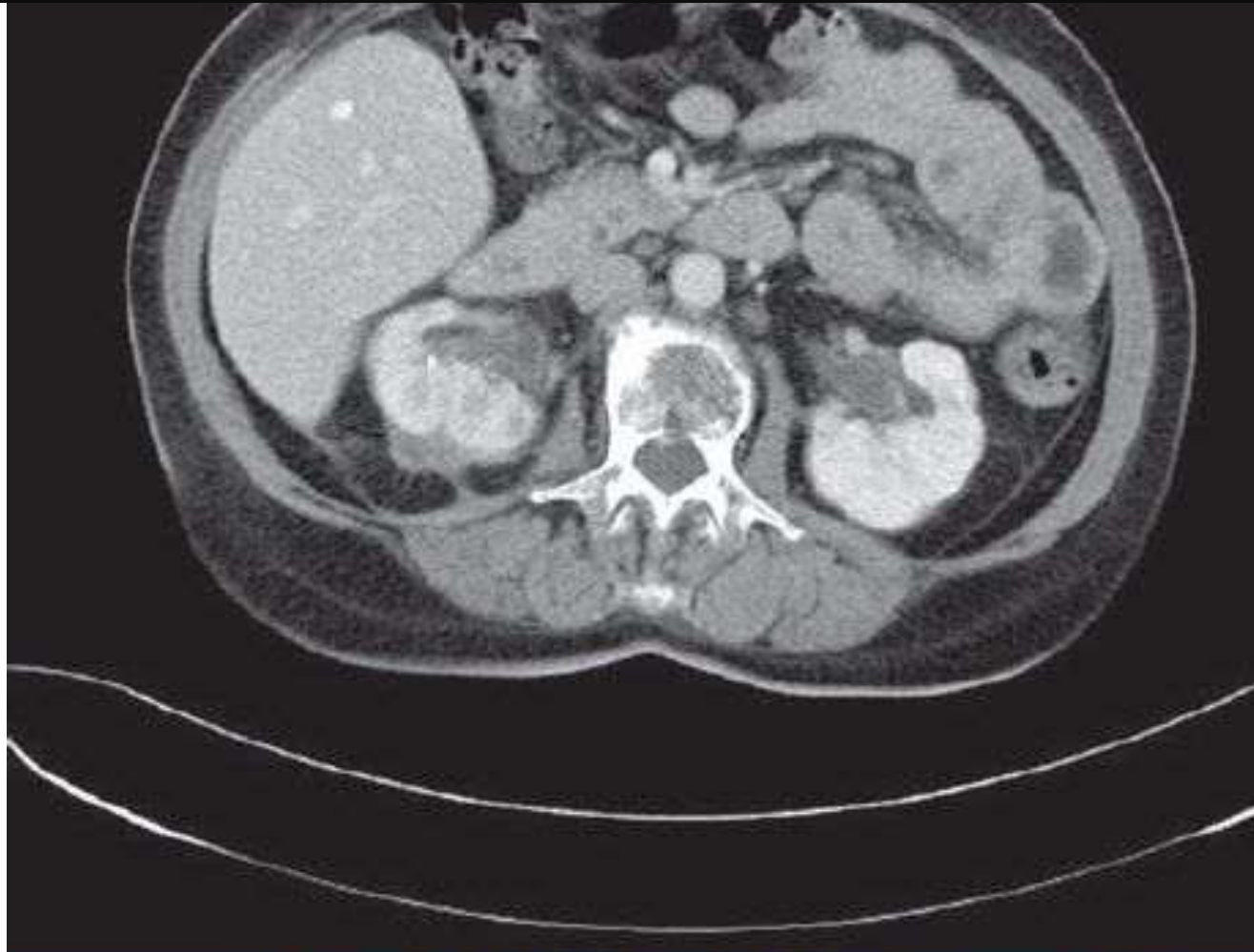
Contrast enhanced CT of abdomen showing large right-sided perinephric collection containing fluid and gas



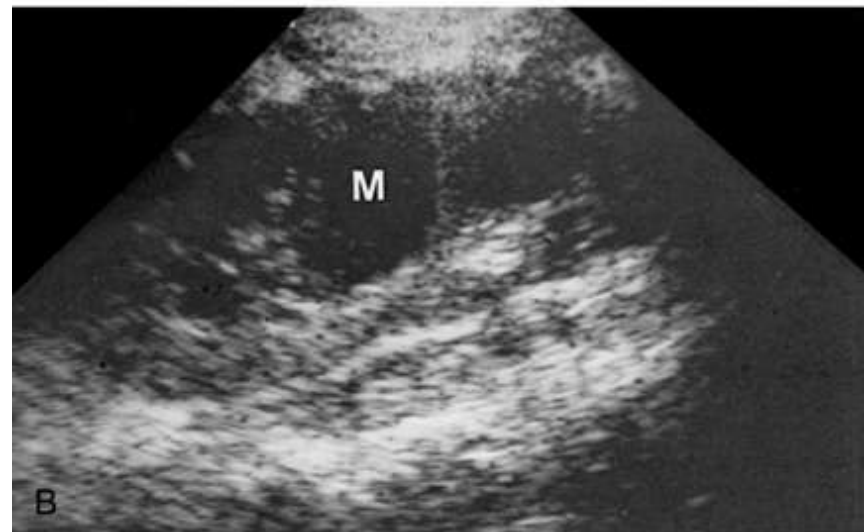
Repeat CT scan of abdomen with contrast showing marked improvement of the perinephric abscess with reduction in size of the collection 2 weeks after percutaneous drainage



Repeat CT scan 3 months later showing marked improvement with significantly smaller residual collection around the right kidney which was thought to represent a haematoma




- Enhanced CT scan shows an irregular septated low-density mass (M) extensively involving the left kidney. Note thickening of perinephric fascia (*arrowheads*) and extensive compression of the renal collecting system





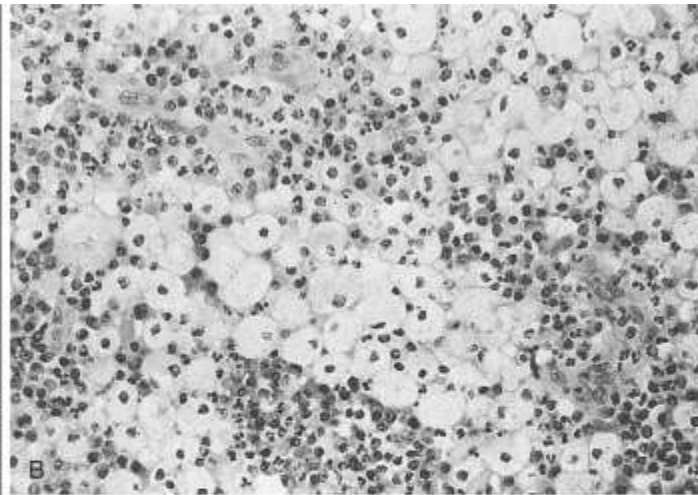
Infectious Granulomatous Nephritis

- Rare
- Severe, chronic renal infection typically resulting in diffuse renal destruction
- Most cases are unilateral
- Result in a non-functioning enlarged kidney associated with obstructive uropathy secondary to nephrolithiasis

- 
- Characterized by accumulation of lipid-laden foamy macrophages
 - The entity is uncommon and is found in only about 0.6% to 1.4%

Pathogenesis.

- Nephrolithiasis, obstruction, and infection
- Nephrolithiasis has been noted in as many as 83%
- Half of the renal stones have been of the staghorn type



Gross specimen. Kidney is massively enlarged

Clinical Presentation

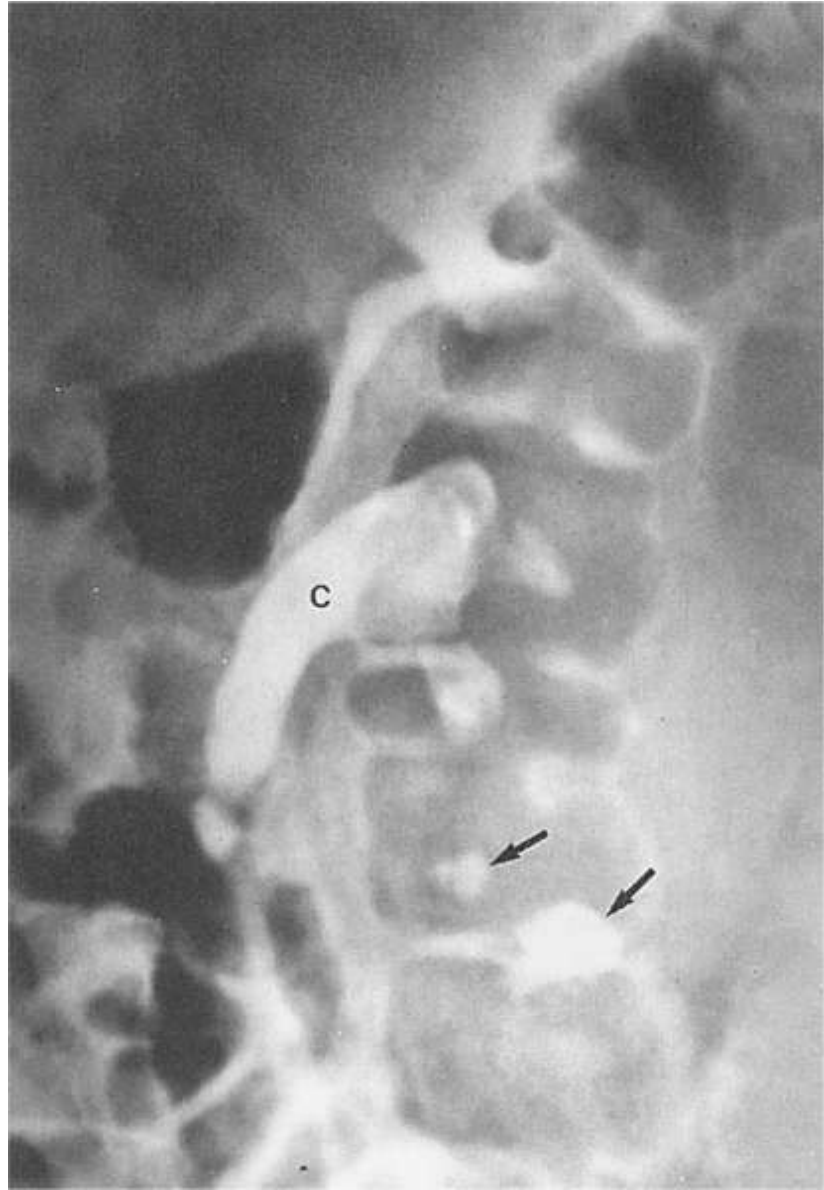
- Suspected in patients with UTIs and a unilateral enlarged non-functioning or poorly functioning kidney with a stone or a mass lesion indistinguishable from malignant tumour
- Flank pain (69%), fever and chills (69%), and persistent bacteriuria (46%)

Diagnosis

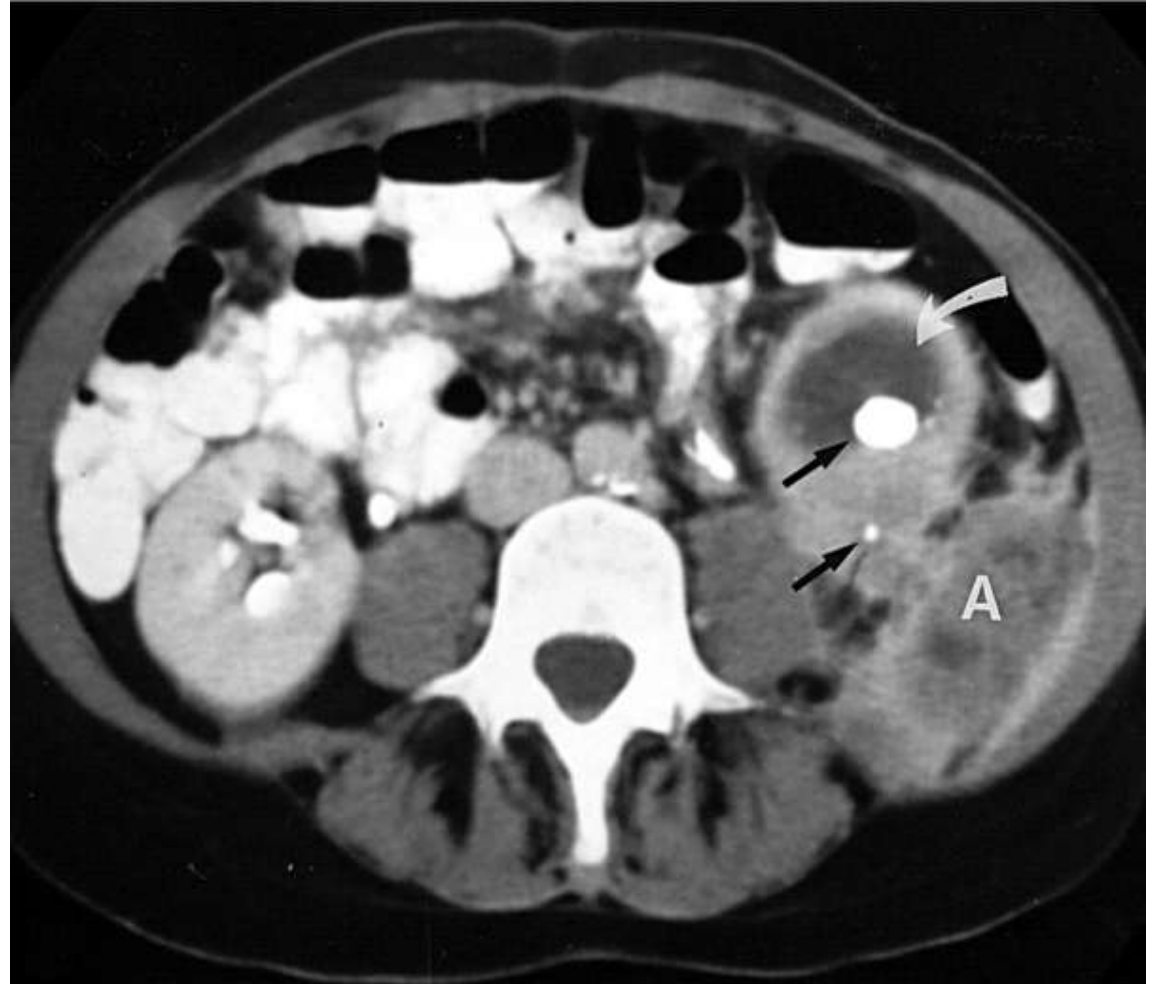
- Literature shows *Proteus* to be the most common organism
- The prevalence of *Proteus* organisms may reflect
 - their association with stone formation and subsequent chronic obstruction and irritation
- Xanthogranulomatous pyelonephritis
 - is almost always unilateral; therefore, azotemia or frank renal failure is uncommon

Radiologic Findings

- Classic triad of unilateral renal enlargement with little or no function and a large calculus in the renal pelvis



- Xanthogranulomatous pyelonephritis.
Enhanced CT scan shows collecting system and parenchymal calculi (*straight arrows*) with lower pole pyonephrosis (*curved arrow*) and an irregular, predominantly low-density perinephric abscess



Management

- Associated with
 - renal cell carcinoma, papillary transitional cell carcinoma of the pelvis or bladder, and infiltrating squamous cell carcinoma of the pelvis
- Therefore, if malignant renal tumour cannot be excluded, nephrectomy should be performed
- It is important to remove the entire inflammatory mass because in nearly three fourths of patients, xanthogranulomatous tissue is infected

CASE REPORT

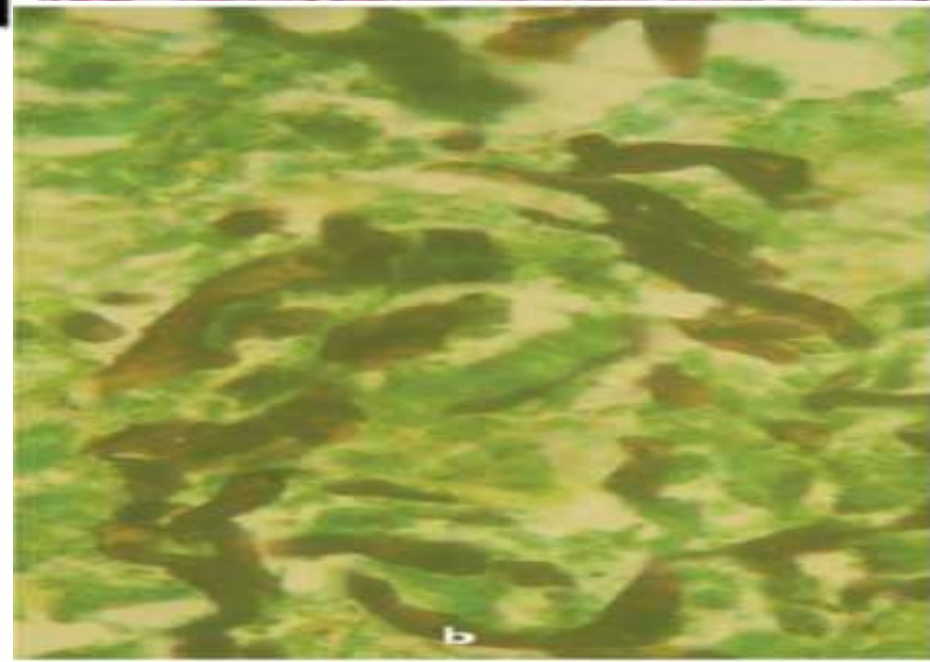
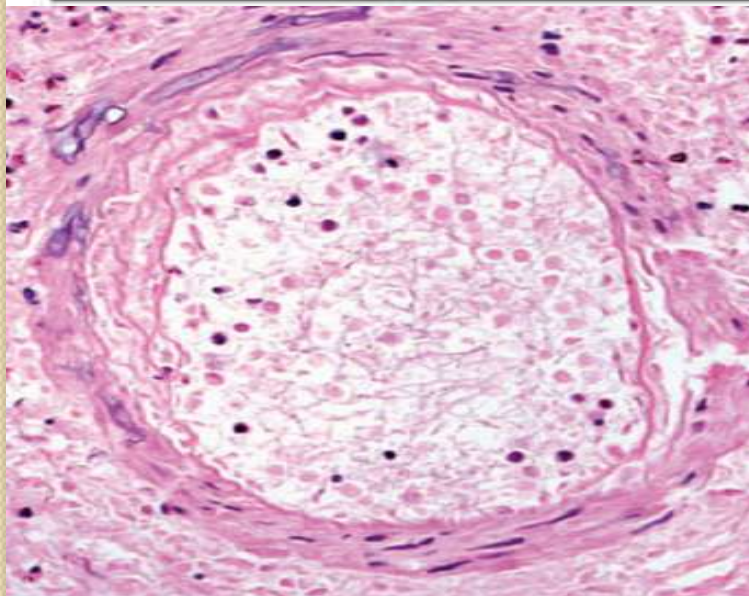
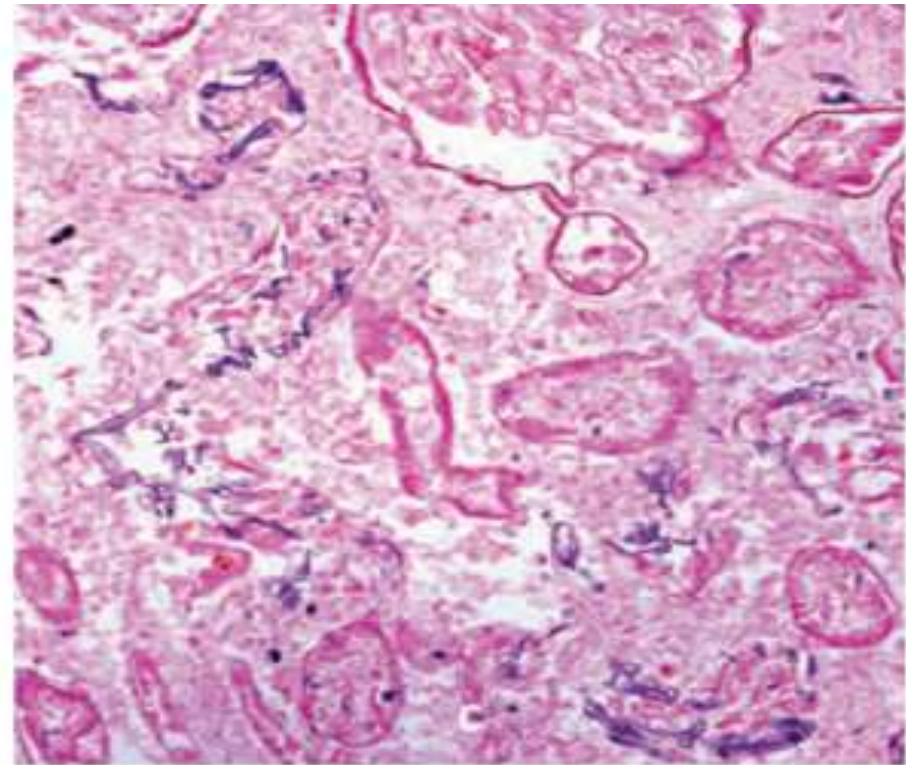
Renal mucormycosis in immunocompetent patients: Report of three cases

Ritu Verma, Mukul Vij, Vinita Agrawal and Manoj Jain

Department of Pathology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

ABSTRACT

Isolated renal mucormycosis is rare in the immunocompetent host. We retrospectively analyzed all histopathology reports of nephrectomy specimens and renal biopsies from our department in the last year. Three patients of isolated renal mucormycosis were identified. All three patients presented with acute abdomen and renal failure. None had a preceding known predisposing disease for mucormycosis. Ante mortem diagnosis was made in one patient. Fungal culture was positive in one case. We emphasize that isolated renal mucormycosis may affect immunocompetent host and greater clinical suspicion is required for prompt treatment in view of poor prognosis associated with renal mucormycosis.



Isolated Renal Mucormycosis after Liver Transplantation: An Unusual Case Report

B Geramizadeh^{1*}, K Kazemi², AR Shamsaifar², A Bahraini², S Nikeghbalian², SA Malekhosseini²

- Renal involvement of mucormycosis has been very rarely reported in the patients with different kinds of immunosuppressive conditions, but most of the previously reported cases of renal mucormycosis are part of disseminated disease and isolated renal involvement is extremely rare.



TTT

- Amphotericin B 50mg/d (max. cumulative dose 2g) I.V
- PCD or OD
- Nephrectomy (was done in all cases eventually).

THANK YOU

يقول يقول امير المؤمنين عليه السلام :
يَحْيَا الْمُؤْمِنُ بَيْنَ أَمْرَيْنِ يُسْرٍ وَ عُسْرٍ
وَ كِلَاهُمَا " نِعْمَةٌ " لَوْ أَيْقَنَ !
فَفِي الْيُسْرِ يَكُونُ الشُّكْرُ
[وَ سَيَجْزِي اللَّهُ الشَّاكِرِينَ]
وَ فِي الْعُسْرِ : يَكُونُ الصَّبْرُ
[إِنَّمَا يُوفَّى الصَّابِرُونَ أَجْرَهُمْ بِغَيْرِ حِسَابٍ]

بِصَوِّبِ الدِّينِ وَ أَمَامِ الْمُتَّقِينَ